3704

Site:
Breach: 2/12
Other:

Olin CHEMICALS
P.O. BOX 248, LOWER RIVER ROAD, CHARLESTON, TN 37310
PHONE: (615) 336-4000

FY '91 3 12 0001

March 10, 1991

FEDERAL EXPRESS

Cheryl Walker Smith
Senior Remedial Project Manager
United States Environmental Protection Agency
345 Courtland Street Northeast
Atlanta, Georgia 30365

Re: Response to EPA's Comments on Olin's 11/89 RI/Risk Assessment
Olin Chemicals/McIntosh Plant Site
McIntosh, Alabama

Dear Ms. Smith:

As we discussed, Woodward-Clyde Consultants (WCC), at Olin's request, incorporated relevant EPA comments on the November 1989 Remedial Investigation/Risk Assessment report prepared for Olin by ERM into the Work Plan submitted on December 15, 1990. Olin also asked WCC to prepare a point-by-point response to EPA's comments in order to have a complete record in the file. You subsequently requested that we submit this response to assist you in your review of the Work Plan. The point-by-point response is attached.

Please let me know if you have any questions regarding the contents of this submission or any of the work in progress at McIntosh, Alabama.

Sincerely,

OLIN CORPORATION

J. C. Brown
Manager, Environmental Affairs

jmm
Enclosure

cc: W. A. Beal
D. E. Cooper (2)
M. S. Davenport
W. J. Derocher
M. L. Fries
W. G. McGlasson
T. B. Odom
R. A. Pettigrew

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GENERAL COMMENTS

1. Olin appreciates the comments regarding presentation of the information. These comments will be taken into consideration during development of future RI/FS deliverables.

2. The omission of a reference section was an oversight. A reference section was included in the RI/FS Work Plan and will be included in future, applicable RI/FS deliverables.

3. Olin will clarify these apparent inconsistencies in future RI/FS deliverables.

4. Olin appreciates the comment regarding presentation of the information. These comments will be taken into consideration during development of future RI/FS deliverables.

   Regarding the groundwater data, as part of the scope of the RI/FS, Olin will evaluate temporal variations in the monitor well analytical data. These data will be presented as time vs. concentration graphs, and also as isoconcentration maps. The monitor well data evaluation will be submitted as a technical memorandum (source evaluation). The groundwater data are discussed in more detail in the response to general comment no. 5.

5. Olin has identified potential source areas that may have associated soils contamination. These include SWMUs that were regulated under 40 CFR 264, SWMUs not regulated under 40 CFR 264 and areas that are not classified as SWMUs (e.g., the CPC plant, the mercury cell plant). The RI/FS Work Plan describes these potential source areas in the initial evaluation section. Olin has implemented a series of closure and removal activities to control future releases from these potential source areas, including nine clean closures.

   To evaluate whether there are significant sources that still exist at the facility (e.g., sources that continue to contribute to groundwater contamination) Olin has

proposed in the RI/FS Work Plan to evaluate the groundwater analytical data. Olin's Post-Closure RCRA permit (September 1986) requires a compliance monitoring program and a corrective actions monitoring program at the facility. Olin samples the compliance monitor wells and corrective action monitor wells on a quarterly basis. Historical trends in the quarterly monitor well data will be evaluated by plotting time vs concentration graphs (clean-up curves) for individual wells, and isoconcentration maps for individual monitoring periods. The approach is that if continuing significant sources do exist, they should be reflected in the data, either in the areal distribution (i.e. the plume is not diminishing as was predicted in the modeling efforts) or the clean-up curves show an increasing or non-diminishing source). After review of this monitor well data, Olin will submit the results to EPA in a technical memorandum (source evaluation).

Olin will also review historical aerial photographs and topographic maps for an indication of other potential source areas that may require investigation.

The source evaluation and review of historical aerial photographs will be incorporated into the Preliminary Site Characterization Summary, and any additional soils investigation that may be warranted as a result of this review will be outlined in the revised Sampling and Analysis Plan.

The "source" located approximately 2300 feet west of the CPC plant, referred to in this document, is discussed in Section 3.1.1.5 of the RI/FS Work Plan. Olin believes that the 1989 RI/RA erred in the characterization of groundwater contamination in this area. Olin has indicated that there was generally greater leakage of organics during the earlier years of CPC plant operations. The contamination in this area is believed to be due to a slug of contamination that migrated from these earlier years. Based on this interpretation, the contamination is not from an anomalous source, but is from the same source as the contamination found closer to the plant.

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The Dixie Laboratories report (Appendix A-7 of the 1989 RI/RA) indicates low pH soils in the vicinity of the CPC landfill (2.5 to 6.5 standard units). From 1952 to 1972 this landfill was used as an acid neutralization pond. Since the low pH soils extend to the Alluvial Aquifer (as indicated by the Dixie report) Olin believes that the existing monitor well network is sufficient to characterize any contaminant migration resulting from these low pH soils. The RI/FS includes a plan to sample five wells screened in the Alluvial Aquifer in the vicinity of the CPC landfill. In addition, one Miocene Aquifer well will also be sampled in this area. Based on these groundwater sampling data in addition to the historical data review discussed above, Olin will evaluate whether these soils are a significant continuing source. If additional soils investigation is required to complete this evaluation, it will be outlined in the revised Sampling and Analysis Plan (SAP).

6. The general comments concerning the limited nature of the available database and the length of time since its collection are valid, especially for risk assessment purposes.

   The RI/FS Work Plan includes extensive basin characterization activities that will provide adequate data for the final baseline risk assessment. Sediment and surface water samples will be collected and analyzed for mercury, volatile organics, semi-volatile organics, pesticides/PCBs. Olin will also conduct a macroinvertebrate study and fish sampling and analysis in the basin as part of the RI/FS activities.

7. Olin will reevaluate the groundwater pathway during the RI/FS. Regarding potential off-site receptors, Olin will review the historical groundwater data to evaluate whether the Corrective Action Plan is effectively controlling off-site migration (see response to general comment 5). In addition, Olin will conduct a domestic well survey within a three mile radius of the facility. With the owners permission, any drinking water wells that are identified, will be sampled. The domestic well survey and sampling activities are described in more detail in the RI/FS Work Plan.

The potential exposure pathway through dermal contact by site workers will be addressed in the final baseline risk assessment.

8. A risk assessment is performed for present site conditions as well as anticipated site uses over a 70 year period. The basis for assuming that future site use will remain industrial should have been included. The Olin site is heavily industrialized and is located in a rural industrialized area with a low population density and expected low residential growth, therefore future residential use is very unlikely. Based on EPA guidance, (Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual, 1989, EPA/540/1-89/002, RAGS) it is not justifiable to include future hypothetical onsite residential receptors in the risk assessment process due to the very low probability of future site use for residential development.

9. An exposure situation associated with routine or repeated access to the site would more appropriately be assessed by evaluating the exposure for a subchronic (2 weeks to 7 years) or a chronic (7 years to lifetime) exposure period. Acute exposures usually represent a single exposure incident or an exposure period of one day.

   In addition, adverse health effects resulting from acute exposures are usually associated with high level exposure situations. Based on the low levels of constituents present as indicated by available site data, acute exposures resulting in adverse health effects are unlikely.

   Also, EPA-derived toxicity values for acute exposures are not available. It is inappropriate to use a toxicity value derived for one exposure period to assess exposure for a dissimilar exposure period. Therefore to quantitatively evaluate noncarcinogenic effects associated with acute exposure, subchronic or chronic reference doses would have to be adjusted for exposure period thereby increasing the uncertainty in the risk estimate.

Subchronic exposures and the associated risk estimates will be included in the final baseline risk assessment.

10. Exposure scenarios involving periodic exposure due to the recreational use of the basin by offsite receptor populations were evaluated in the risk assessment. This will be reevaluated as part of the final baseline risk assessment.

11. Olin will reevaluate the groundwater pathway as described in the response to general comment 7. Acute exposures and subchronic exposures are discussed in the response to general comment 9. Future land use scenarios are discussed in the response to general comment 8.

12. Recovery Well CA5 was installed to arrest the apparent plume movement to the southeast. It should be noted that the semi-annual reports to ADEM and EPA under the RCRA post-closure permit include data indicating that the Corrective Action Program (CAP) is effectively preventing offsite migration.

13. The closure and removal activities that have been implemented at the site are believed to have isolated the contaminated soils in the plant area from direct contact. The groundwater pathway is discussed in the response to general comment 11. If the need for additional soils characterization is warranted by the activities described above, these will be outlined in the revised SAP, and the results will be used in the final baseline risk assessment.

14. The chemicals of concern will be reevaluated during the RI/FS. A technical memorandum listing hazardous substances and indicator parameters will be submitted as part of the baseline risk assessment task.

15. The existing chemical data for the basin area indicate the presence of low concentrations of contaminants. The affected sediments are generally covered by a water column, which limits the potential for air releases. Organic constituents were not detected in the surface water, and the highest mercury concentration detected was 0.2 mg/l. Based on these data, air releases from the

basin were shown to be negligible. The potential risk associated with air releases from the basin will be revaluated during the final baseline risk assessment.

Emissions from the 16 state and/or federally regulated air discharge sources are assessed through the permitting process. It is not appropriate to evaluate these sources during the RI/FS.

16. During the RI/FS, groundwater data will be collected in accordance with an approved Field Sampling and Analysis Plan and Quality Assurance/Quality Control Plan to verify that past data are consistent with data collected under current CERCLA standards.

TECHNICAL REVIEW AND SPECIFIC COMMENTS

1. These inconsistencies were addressed in the RI/FS Work Plan, which reflects those SWMU's listed in the AOC.

2. There are a total of 113 monitor wells and 5 corrective action wells at the facility.

3. In the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300), EPA states that: "For known or suspected carcinogens, acceptable exposure levels are concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6}." The maximum carcinogenic risks estimated in the 1989 RI/RA for adults and children 6 to 12 are 1.06E-04 and 2.57E-04, respectively. These risk estimates are in the 10^{-4} range but exceed the upper limit of 1.00E-04 by a value of 0.06E-04 for adults and by a value of 1.57E-04 for children 6 to 12.

4. A location map (Figure 1) and a Facility Layout (Figure 2) are presented in the RI/FS Work Plan. Olin is currently developing a facility base map that is

referenced to the plant coordinate system to be incorporated into future RI/FS deliverables.

5. The data base is for all monitor wells including the single well that is located within Operable Unit 2 (the basin area and associated wetlands). In addition, the basin sediment and water sampling results are also included in the data base.

   Soils investigations that have been conducted at the facility will be summarized as part of the final RI/FS.

6. The active facilities, as listed in the RI/FS Work Plan, encompass about 60 acres.

7. Figure 2 of the RI/FS Work Plan (Facility Layout) includes the identification of pertinent features including the basin and associated wetlands.

8. Figure 1 of the RI/FS Work Plan shows the facility and the Olin property boundary outlined on a USGS topographic quadrangle, 7.5 minute series. The location of Bilbo Creek is shown on this map to the west of the facility.

9. Olin believes that the regional setting of the facility can be described adequately without presenting a separate map showing the site relative to the physiographic provinces.

10. The figures presented in the RI/FS Work Plan are clearly legible. Olin will provide legible copies of figures in all future RI/FS deliverables.

11. More accurate terminology for the SWMUs is presented in the RI/FS Work Plan and will be used consistently in future RI/FS deliverables.

12. Section 5.4.3 of the 1989 RI/RA describes the CAP treatment system in more detail. Additionally, Olin's Post-Closure Permit (ALD008188708) and application describe the Corrective Action Program (CAP) in great detail.

13. On November 30, 1987, Olin submitted a revised groundwater corrective action plan to EPA and ADEM to be incorporated into their RCRA post-closure permit. In this plan the calculated time for clean up is between 25 and 27 years. The clean-up criteria is drinking water standards (for the parameters that have designated standards), and 100 ug/l total organics (i.e., the sum of the organics). Olin's RCRA Post-Closure Permit (ALD008188708) and semi-annual reports submitted thereunder describe the ability and success of the CAP to mitigate contaminated groundwater.

    As discussed in the response to general comment 5, the quarterly groundwater monitoring data will be evaluated during the RI/FS. This evaluation will be used to demonstrate the CAP's effectiveness compared to the projected goals as established in the permit. In addition, as part of the RI/FS, Olin will submit a technical memorandum describing any additional groundwater flow or contaminant transport modeling, if any, that is determined to be appropriate.

14. A summary of previous investigations is presented in the RI/FS Work Plan.

15. Based on boring log data Olin has concluded that the clay aquitard (Miocene confining unit) is continuous across the site with an average thickness of 100 feet. These data were correlated with regional stratigraphic information to evaluate the continuity and thickness of this unit beyond the boundaries of the McIntosh facility. The data will be reviewed during the RI/FS. especially with regard to any additional information available since previous reports.

16. These are shown correctly in Figure 2 of the RI/FS Work Plan. Figure 2-1 of the 1989 RI/RA is flawed and should not be used for information regarding the McIntosh site.

17. The contamination at the facility is due to past activities, particularly the operation of the CPC plant area and the mercury cell plant area. Both of these

plants have been closed. Therefore, the current process information that is requested would not be applicable to the RI/FS.

18. Specific disposal records are not available. There were general guidelines that were followed prohibiting the disposal of chemical waste in these landfills. The types of waste that were allowed by these guidelines included general plant refuse (e.g., construction material, paper, and corrugated cardboard).

19. These changes have been incorporated into the RI/FS Work Plan.

20. The correct number and designation of RCRA SWMUs are presented in the RI/FS Work Plan.

21. These comments have been incorporated into the RI/FS Work Plan.

22. Figure 2 of the RI/FS Work Plan shows the correct location of the brine filter backwash pond.

23. The strong brine pond was a process unit, not a waste facility, that was closed at the same time as the weak brine pond. All material was removed from this pond and placed in the weak brine pond at closure. Because it never received waste, this unit is not listed in the AOC as a SWMU. Based on this and the fact that all material was removed, it is therefore not included as part of the RI/FS.

24. The location of the former TCAN hydrolyzer is shown of Figure 2 of the RI/FS Work Plan.

25. Figure 1 of the RI/FS Work Plan shows the facility and the Olin property boundary outlined on a USGS topographic quadrangle, 7.5 minute series. Given the relatively low relief across the area, Olin believes that this map is sufficient to show the topography.

26-35 These comments relate to apparent discrepancies and inconsistencies in the data and provide recommendations for presenting the information. Olin appreciates these comments, and where applicable, they will be incorporated into future RI/FS deliverables.

To clarify comment 30, Olin asks that EPA describe in what way the well construction details in Appendix B are incomplete so we can supplement them if the information is available.

36. For dissolved metal analyses of groundwater samples, it is appropriate to filter the samples in the field (Procedures Manual for Groundwater Monitoring of Solid Waste Disposal Facilities, U. S. EPA SW-611, December 1980). The significant parameter in groundwater is the dissolved metal fraction because it is dissolved constituents that may migrate. An acid preservative is required to prevent precipitation of the metals after sample collection. If this preservative is added to an unfiltered sample, the metal fraction that is on the suspended solids will be dissolved into solution. The result would be an anonymously high metal concentration, reflective of the turbidity of the water sample rather than the dissolved concentration in the groundwater. In the CME report referenced in this comment, the concern was that if solids were present in the sample it would be possible for metal constituents to be sorbed to the solid particles. However, the partitioning between the solid and liquid phase should have approached equilibrium at the time of sampling. Therefore the error introduced by filtering the sample is much less than the error that would introduced by adding an acid preservative to an unfiltered sample.

37. The foundation data provide additional information regarding soil type and aids in the stratigraphic interpretations. No cross sections were prepared for these investigations. Where appropriate, these borings will be used in generating stratigraphic interpretations and cross sections for the RI/FS.

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38. The results of the S&ME investigation are incorporated into subsequent sections of the report (Section 3.0 and Section 4.0). A brief summary is presented in the RI/FS Work Plan.

39. Bullet 1 - Section 2 is a summary of remedial investigations and is not an assessment of the risk associated with exposure to basin constituents. The primary drinking water standard is presented only for comparison. The baseline risk assessment (Section 6.0) provides an ecological assessment in which a hazard index is calculated from the AWQC. All eight of the samples collected during the 1988 investigation exceeded the detection limit of 0.2 ug/l and thus exceeded the AWQC. These data are presented in Appendix A-4 of the 1989 RI/RA. Approved EPA analytical procedures for mercury in water have detection limits higher than the AWQC. For future analysis of risk, the methods for evaluating constituents that are reported below the detection limit will be based on current EPA guidelines (RAGS, 1989).

Bullet 2 - Again, the data in this section is not presented to evaluate the risk associated with the site, and the leachable mercury (EP Protocol) is only listed for comparison. Section 6.0 of the 1989 RI/RA uses the total mercury concentrations when evaluating risk, not the EP leachate analyses. In any event, it would be inappropriate to compare any extract concentration to an AWQC. The AWQC standards were developed for the protection of aquatic life in surface water.

40. The basin will be characterized during the RI/FS, as described in the response to general comment 6. This more complete characterization should address EPA concerns.

41. A domestic well survey will be conducted as part of the RI/FS. Olin will conduct this survey to identify drinking water wells within a three mile radius of the site. This will update the 1988 data that is presented in the 1989 RI/RA. With the owner's permission, the drinking water wells that are identified will be sampled. These wells will be plotted on an area map (e.g. USGS topographic quadrangle,

7.5 minute series). To the extent the information is available, residential and business areas within the vicinity of the site (three mile radius) will also be plotted on this map.

42. Olin will incorporate this comment into future RI/FS deliverables.

43. The acceptable limits for pH were between 2.0 and 12.5 standard units. The acceptable limit for mercury was below 200 ug/l based on EP toxicity analyses. Six samples were analyzed for pH, with resulting values between 11.4 and 11.5 standard units. Ten samples were analyzed for mercury using EP toxicity test procedures. The results were all below 0.2 ug/l.

44. As part of the scope agreed to for the RI/FS Olin will demonstrate the equivalency of past clean closures under 40 CFR 265 to 40 CFR 264 requirements. If additional data are required for this demonstration, these data will be collected.

45. The required limit was 200 ug/l mercury. All the samples tested below the required limit.

46. Four wells were installed to monitor this unit (FP1, FP2, FP3, and FP4) as listed in Table 2-9.

47. See response to specific comment 23.

48. Olin's post closure permit provides post-closure assurance for this unit.

49. There are three ash ponds, two inactive and one active.

50. The lime ponds were closed prior to RCRA, and this information is not available.

51. The location of the former TCAN unit is shown in Figure 2 of the RI/FS Work Plan. The TCAN unit was clean-closed under 40 CFR 265 with no post-closure

monitoring requirements since it was an above ground tank; therefore, there are no monitor wells associated with this unit.

52. The location of the former PCB/Hexachlorobenzene unit is shown if Figure 2 of the RI/FS Work Plan. This unit was clean-closed under 40 CFR 265 with no post closure monitoring requirements; therefore, there are no monitor wells associated with this unit.

53. The weak brine pond was a hazardous waste unit that was closed under 40 CFR 265. Since material was solidified in place, a RCRA cap was required, as shown in Figure 3-5. The other units that were closed under CFR 265 were clean closed, and caps were not required.

54. These data were obtained from a combination of sources, including the Betz and Converse Report presented in Appendix A-2 and the S&ME report presented in Appendix A-3 of the 1989 RI/RA.

55. Olin appreciates the comment, and it will be taken into account when developing future RI/FS deliverables.

56. Figure 3-6 is from the 1977 Betz and Converse Environmental Impact Assessment, included as Appendix A-2 of the 1989 RI/RA.

57. Olin appreciates the comment, and it will be taken into account when developing future RI/FS deliverables.

58. Olin will include a delineation of the 100-year flood plain contour in the RI/FS report.

59. The 1976 data are from the 1977 Betz and Converse report (Appendix A-2 of the 1989 RI/RA). As part of the RI/FS, Olin will conduct a review of the literature and contact appropriate agencies for more current water quality data on the

Tombigbee River. Olin will incorporate any additional data into the basin investigation presented in the RI/FS Work Plan.

60. Non-detects are listed as 0 in Table 3-6 as is shown for dissolved mercury.

61. Figure 3-9 is from the 1977 Betz and Converse report (Appendix A-2 of the 1989 RI/RA).

62. These data were collected in 1976. At that time Olin was operating a mercury-cell chlor-alkali plant. They were authorized to discharge mercury to the Tombigbee River under their NPDES permit. The mercury-cell plant was shut down in 1982. As part of the RI/FS Olin will conduct a detailed investigation of the basin, the discharge canal and the associated tributaries to the basin. This investigation will include sediment, surface water and fish sampling. In addition, Olin will incorporate any existing water quality data on the Tombigbee River that is identified.

63. Olin appreciates the comment, and it will be taken into account when developing future RI/FS deliverables.

64. The scale is consistent throughout the diagram. Olin appreciates the comment regarding presentation of the data, and it will be taken into consideration during development of future RI/FS deliverables.

65. Based on boring log data Olin has concluded that the clay aquitard (Miocene confining unit) is continuous across the site, including the basin area. As part of the RI/FS, these data will be correlated with regional stratigraphic information to evaluate the continuity and thickness of this unit beyond the boundaries of the McIntosh facility.

66. Olin appreciates the comment regarding the apparent discrepancies between the text and Figure 3-14. Olin will correct these in future RI/FS deliverables.

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67. Figure 3-14 was generated from the lithologic logs that were prepared from borings completed during several investigations.

68. North is to the top of the map.

69. Olin appreciates the comment, and it will be taken into account when developing future RI/FS deliverables.

70. This list will be verified and updated during the RI/FS, as stated in Section 4.1.1 of the RI/FS Work Plan.

71. The statement means that contaminant concentrations were below the detection limit. No interpretation should be inferred as to whether these contaminants were present at unquantifible concentrations below the detection limit.

72. Historical and current isoconcentration maps will be generated during the evaluation of the quarterly monitor well data (as described in the response to general comment 5).

73. The data are presented in figures 4.9 through 4.14 of the 1989 RI/RA.

74. As discussed in the response to general comment 5, Olin has identified potential source areas that may have associated soils contamination. These include SWMUs and non-SWMUs. Olin has implemented a series of closure and removal activities to control future releases from these potential source areas, including nine clean closures. Further, Olin will review groundwater chemical data from monitor wells sampled during the corrective action program to evaluate whether continuing significant sources exist (see response to general comment 5).

75. The degradation of these types of organics to chloroform is well documented. Olin produces the same waste at their Rochester, New York facility. The waste

is managed by hydrolyzing it under mild hydrolysis conditions to degrade the waste to chloroform. Olin then recovers the chloroform for reuse.

76. The "anomalous source" referred to in this document is discussed in the RI/FS Work Plan. As discussed in the response to general comment 5, Olin believes that ERM erred, and there is no "source" in this area. Olin has indicated that there was generally greater leakage of organics during the earlier years of CPC plant operations. The contamination in this area is believed to be due to a slug of contamination that migrated from these earlier years. Based on this interpretation, the contamination is not from an anomalous source, but is from the same source as the contamination found closer to the plant. Since migration to this area is believed to be in the groundwater, a soils, or vadose zone, investigation would not be required.

77. The statement should have read that there are no "suspected" current contributing sources. The activities proposed for the RI/FS (the closure equivalency, and the source evaluation) will provide more information on potential current sources of surface water and sediment contamination.

78. These are data from Olin's monitoring program under their NPDES permit. These biota assay data results have all been within Olin's NPDES permit limitations. These data do not provide information relevant to the RI/FS because they relate only to recent federally permitted surface water discharges.

79. The background sample was collected from a grassy area to the west of the CPC plant.

80. The sampling program was conducted with a hand auger. The purpose of the hand auger investigation was to assess the lateral distribution of constituents in the surficial soils. Five to eight feet was sufficient for this assessment. It was concluded from this hand auger investigation that the organics had reached the groundwater. Further characterization of the extent of contamination was conducted by evaluating groundwater contamination with monitor wells.

81. As discussed above, a review of the historical groundwater data will be conducted as part of the RI/FS, and the results of this review will be submitted as a technical memorandum (source evaluation).

82. The sample was analyzed for mercury.

83. 1) Total leachable mercury in extract per weight of soil sample.
2) Total leachable mercury in extract per volume of aliquot (the EP Toxicity test result).

84. Olin will take these comments into consideration when presenting the groundwater data in the RI/FS.

85. The statement in the text regarding periodic localized increases refers to the evaluation of the localized variations in data from individual wells. Olin agrees that there is an area-wide plume (> 0.1 mg/l) and in response Olin designed the Corrective Action Program (CAP) well network to recover the plume. As discussed above, a review of the historical groundwater data will be conducted as part of the RI/FS, and the results of this review will be submitted as a technical memorandum (source evaluation).

86,87 Olin will address these apparent discrepancies and recommendations for data presentation in future RI/FS deliverables.

Chloride is not a CERCLA hazardous substance. There is a general trend at the site of elevated chloride concentrations associated with elevated hazardous substance concentrations, and chloride has been used as an indicator parameter. Chloride concentrations in groundwater in the western part of Olin property could be related to several possible sources. Olin has conducted brine well operations in this area since 1952. These operations include cavity development, brine settling, transfer to and from the plant, and brine re-injection. The chloride concentrations in groundwater in the western part of Olin property do not follow the pattern of organic concentrations in this area. This is consistent across the

site, i.e., elevated chlorides can be, but are not necessarily, correlated with organics. Chlorides in the main plant area (around the weak brine and pH ponds) are correlated with significant (>2 ppb) Hg concentrations. Mercury concentrations in the western part of Olin property are insignificant (<2 ppb). Olin believes the chlorides in the western part of the property are related to brine well operations or natural sources associated with the salt dome. This is based on the low mercury concentrations and the differences in concentration patterns between chlorides and organics. Therefore an investigation of the high chloride concentrations in this area is not included as part of the RI/FS.

88. Olin will take these comments into consideration when presenting the data for future RI/FS deliverables.

89. The cross contamination discussed in this section is believed to be an isolated occurrence due to insufficient decontamination procedures either during well installation or during sampling. The Miocene wells were double cased and are not believed to be a continuing source of contamination. Olin will initiate a program to evaluate the existing monitor well network and make recommendations for plugging and abandoning wells that may have suspect integrity or wells that no longer are required for the monitoring program.

90. The g-HCCH (lindane) data are presented in this section for completeness. Olin has never manufactured, formulated, handled a significant quantity, or disposed of lindane at the McIntosh plant site, and therefore it is not included in the subsequent evaluation of potential risk.

91. The 1.8 ppb reported for the effluent water was from a single sampling event. The Tombigbee River results are based on six samples from differing depths and cross sections. These data are presented In WQ Memo 2 of Appendix A-1 of the 1989 RI/RA.

92. The basin surface water mercury concentrations are compared with the AWQC when evaluating risk (Section 6.0 of the 1989 RI/RA).

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93. Replicate samples were collected at the same time as the original samples. The original sampling plan had provisions for analyzing a percentage of the replicate samples for QA/QC purposes. However, after receiving the sample results, Olin decided to analyze selected replicate samples beyond what was originally specified.

94. Periodic air monitoring is not conducted at the facility on a regular basis. Air monitoring is conducted by the industrial hygiene department during specific projects where there may be a potential for exposure to site workers. These data would not be applicable to the RI/FS.

95. The RI/FS Work Plan includes analysis of groundwater and basin sediments and surface water for volatile organics, semi-volatile organics, and pesticides/PCBs using CLP protocols.

96. The basin surface water is compared with AWQC in Section 6.0 of the 1989 RI/RA.

Mercury and hexachlorobenzene are interpreted to be bound to the soils because hexachlorobenzene was not detected in the surface water and mercury was detected at concentrations at or below 2.0 ppb. Both these constituents were detected in the soils.

The decrease in source volume accompanied by natural degradation of the material is believed to be the cause of the apparent reduction in mobility.

97. The soils investigation (i.e. investigation of the vadose zone) that was referred to in this report was limited to the CPC plant area. The samples were not analyzed for metals. However, with the exception of mercury, metals have not been a concern at the McIntosh facility.

Additional potential source areas that may have associated soils contamination were addressed by the closure and removal activities, which were implemented

to reduce the potential for direct contact and to limit the release of contaminants from these areas to the groundwater. Data have been collected during the closures (e.g., brine filter backwash pond, pH pond) to demonstrate that the soils beneath these areas were within acceptable limits for closure. Olin proposes to assess the effectiveness of these activities and the occurrence of other potential source areas by evaluating the quarterly monitor well data (as described in the response to general comment 5). These data will be presented in a technical memorandum (source evaluation). Any further soils investigation requirements indicated by this evaluation will be outlined in the revised SAP.

Further, the adequacy of the closures conducted under 40 CFR 265 will be assessed during the equivalency demonstration activities. If additional data are required for this demonstration, these data will be collected.

98. Olin's post closure permit includes monthly inspections of the closed CPC landfill and the closed Weak Brine Pond.

99. Olin is committed to ensure that the pumping and treatment systems handle the required water volumes.

100. Yes these are the same programs: a Modular Three-dimensional Finite Difference Ground-Water Flow Model; Michael G. McDonald and Arlen W. Harbaugh, USGS.

The Ciba-Geigy rates are the actual pumping rates.

101. The system design is based on 650 gpm from the five wells. The actual cumulative pumping rate of the five wells is approximately 590 gpm. The treatment and pumping systems have the capability to treat at the design rate even though the actual rate is limited to 590 gpm by well yield. Olin's RCRA Post-Closure Permit (ALD008188708) and semi-annual reports submitted thereunder describe the ability and success of the Corrective Action Program (CAP) at these pumping rates to mitigate contaminated groundwater.

3 [illegible] [illegible]22

102. The water recovered from CA-3 and CA-5 have pH values that require pretreatment. The other wells have acceptable pH with no pretreatment required.

103. Outfall 002 is tested for mercury. These analyses are reported as required by Olin's NPDES permit.

104. Olin appreciates the comment, and it will be considered when presenting the information in future RI/FS deliverables.

105. Olin proposes in the RI/FS Work Plan to review the quarterly monitor well data to assess the overall trends in the organic plume configuration since implementation of the Corrective Action Program (see response to general comment 5). Olin believes that this will be a more effective way of evaluating the data, rather that looking at only two sampling events as is presented in this report.

106. See the response to comment 105.

107. The final baseline risk assessment for the RI/FS will be prepared in accordance with EPA's Risk Assessment Guidance for Superfund: Volume 1 Human Health Evaluation Manual, EPA/540/1-89/002, 1989.

108. The routes of exposure are included the discussion of exposure pathways, Section 6.2.1.4, page 6-16, of the 1989 RI/RA. Routes of entry are discussed in Section 6.2.1.4 of the 1989 RI/RA.

109. "Risks" is the correct terminology for describing the outputs of risk characterization.

110. The use of animal models introduces two types of uncertainty into the risk assessment: those related to extrapolating from one species to another and those related to extrapolating from the high exposure doses used in experimental animal studies to the lower doses estimated for human exposure situations. The

degree of uncertainty associated with toxicity information derived from animal models is dependent on the quality of toxicity studies available and the completeness of the supporting data base and will vary for each chemical evaluated.

The final baseline risk assessment will include, for each chemical evaluated, a discussion of the strength of evidence of the toxicological studies available and the subsequent degree of confidence ascribed to each toxicity value utilized in the risk assessment. This approach will provide for a chemical-specific evaluation of the uncertainties related to the toxicity information utilized in the assessment.

In general, EPA states that carcinogenic risks estimated utilizing EPA derived slope factors are upper-bound estimates and that the actual risk may be lower or could be zero.

111. The statement was meant to covey that the estimated risks are "worst case", and are therefore conservative. However, the use of overly conservative assumptions in the development of "worst case" or upper-bound exposure scenarios may result in exposure estimates above the range of possible exposure situations resulting in the overestimation of actual exposure and associated risk. EPA does not recommend the use of worst case scenarios for exposure assessment purposes. Current EPA risk assessment guidance recommends the use of a reasonable maximum exposure which is defined as the highest exposure that is reasonably expected to occur at the site and is calculated utilizing the upper confidence limit on the arithmetic mean for each exposure assumption. This reasonable maximum exposure approach (rather than "worst case") will be used in the final baseline risk assessment.

112. The exposure routes are briefly discussed in section 6.2.1.4 of the 1989 RI/RA. A more through discussion of route of exposure in relation to media and receptor populations will be presented in the final baseline risk assessment.

113. Possible release sources, release mechanisms, and receiving media are essential to the identification of exposure pathways and will be discussed in detail in the exposure assessment of the final baseline risk assessment.

114. The groundwater pathway is addressed in the response to general comment 7.

115. Soil exposure should be addressed for onsite receptor populations if site specific activities result in exposure to chemical constituents present in the soil. Because of the closed status of documented sources of onsite soil contamination, the exposure pathways involving soil are currently considered incomplete. The additional activities proposed for the RI/FS under site characterization will be used to reevaluate the soil exposure pathways.

A risk assessment is performed for present site conditions as well as anticipated site uses over a 70 year period. The basis for assuming future site use will remain industrial should be included. The Olin site is heavily industrialized and is located in a rural industrialized area with a low population density and expected low residential growth, therefore future residential use is very unlikely. Based on EPA guidance, (RAGS, 1989), it is not justifiable to include future hypothetical onsite residential receptors in the risk assessment process due to the very low probability of future site use for residential development. Therefore the potential exposures associated with future land use will be the same as the potential exposures associated with present site usage because the use of the site is not expected to change.

116. Table 6-3 of the 1989 RI/RA states swimming exposure pathways are excluded based on the following reasons: "site is patrolled by security, basin is a long distance from nearest residence, basin is shallow, bounded by wetlands, and is unattractive to swimmers, adjacent reach of Tombigbee River is not classified for contact recreation"

117. The basin will be characterized during the RI/FS. The RI/FS Work Plan presents the details of the proposed basin characterization activities.

118. Actual levels of constituents detected will be presented in the final baseline risk assessment.

119. Actual levels of constituents detected will be presented in the final baseline risk assessment.

120. In the final baseline risk assessment, the approach will be to evaluate the pathway qualitatively or to estimate exposure point concentrations utilizing environmental fate and transport models rather than to disregard the pathway completely.

121. The basin will be characterized during the RI/FS and representative data will be collected, including fish sampling data, to obtain reliable exposure point concentrations.

122. Given the conservative value used for f_{oc}, Olin believes that it is appropriate to use an assumed value. EPA risk assessment guidance states that it is preferable to obtain site-specific values for as many model input parameters as is feasible. However, if the model is not sensitive to a particular parameter for which a default value is available, default values may be used.

123. See response to general comment 9.

124. EPA derived acute reference doses are not available. Therefore to quantitatively evaluate noncarcinogenic effects associated with acute exposure, subchronic or chronic reference doses would have to be adjusted for exposure period thereby increasing the uncertainty in the risk estimate.

For the assessment of carcinogenic effects, the exposure duration included in the calculation of intake may represent an acute exposure of 24 hours or less. However, calculations of risk associated with exposures of longer duration were evaluated in the risk assessment. Acute exposures at the same exposure level (maximum concentration detected) would be expected to result in lower risk

estimates and therefore it would not be necessary to calculate risks associated with acute exposures separately.

Due to the relatively low concentrations of constituents identified by currently available data, adverse health effects associated with an acute exposure situation would not be expected.

125. In the final baseline risk assessment, as stated in RAGS, 1989, chronic daily intake for carcinogens will be based on an averaging time equivalent to a lifetime (70 years). To distinguish between average exposure and reasonable maximum exposure scenarios, exposure point concentration, exposure duration, exposure frequency, contact rate, and other exposure assumptions utilized in the calculation of chemical intake will be represented by average and reasonable maximum estimates of each parameter, respectively.

126. The standard parameters for calculation of dosage and intakes for the final baseline risk assessment will be based on EPA recommended values. In some cases these values may not be appropriate for the McIntosh site. Any exceptions to the EPA recommend values will presented to EPA for their concurrence prior to use.

127. Olin has reviewed the references, and will use the following values in the final baseline risk assessment:

- The inhalation reference dose for 1,2-dichlorobenzene is 4×10^{-2} mg/kg/day. (HEAST)
- The inhalation reference dose for 1,4-dichlorobenzene is 7×10^{-1} mg/m^{-3} which corresponds to 2×10^{-1} mg/kg/day. (HEAST)
- The inhalation cancer slope factor for hexachlorobenzene is 4.9×10^{-4} $(ug/m^3)^{-1}$ which corresponds to 1.7×10^{-4} $mg/kg/day^{-1}$. (HEAST)

- The reference for pentachloronitrobenzene should be HEAST.

- The oral reference dose for inorganic mercury is pending. (IRIS) The oral reference dose for inorganic mercury is 3 X 10^{-4} mg/kg/day. (HEAST)

- The oral reference dose for alkyl mercury is 3 X 10^{-4} mg/kg/day. (HEAST) The reference for both alkyl and inorganic mercury should be HEAST.

128. For the final baseline risk assessment, references utilized for toxicological data will be documented in the text as well as in the appendices.

129. CRAVE is an acronym for Carcinogen Risk Assessment Verification Endeavor.

130. The hazard quotients and risks were calculated for each individual chemical, for each exposure pathway, for each receptor population. The individual chemical quotients and risk were then summed to provide a total hazard index or risk for each pathway for each receptor. This information is presented in Tables 10 A, B, and C of the 1989 RI/RA for noncarcinogenic hazard indices and is presented in Tables 12 A, B, and C of the 1989 RI/RA for carcinogenic risks. The total hazard indices and risks for each pathway were summed for each receptor population to provide an assessment of simultaneous exposure to multiple chemicals via multiple exposure pathways. These values are presented in Table 11 of the 1989 RI/RA for noncarcinogenic health effects and in Table 13 of the 1989 RI/RA for carcinogenic risks.

131. Table 10 B: Of the exposure media, exposure routes, and chemicals of concern evaluated, exposure to mercury through fish ingestion (hazard quotient of 9.68E-01) contributes most significantly (80%) to the total hazard index of 1.21E+00. The second greatest contribution (11%) is due to exposure to hexachlorobenzene through fish ingestion (hazard quotient of 1.4E-01).

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[1]132. EPA methodology is based on the assumption of dose additivity and is most appropriately applied to compounds that induce the same effects by the same mechanism of action. If a hazard index is above unity, it is appropriate to segregate the compounds by effect and by mechanism of action and to derive separate hazard indices for each group of chemicals. EPA guidance (RAGS, 1989) states that agency review of particularly complex or controversial cases can be requested of ECAO. It further states that prior to segregating two compounds which produce adverse effects on the same organ system by different mechanisms, the case should be reviewed by ECAO. Neither of these two criteria are applicable to this assessment and therefore, according to EPA risk assessment guidance, ECAO review is not necessary for the segregation of mercury exposure from the other chemicals of concern evaluated. Based on a review of the toxicological information provided in Section 6 of the 1989 RI/RA, it is toxicologically appropriate to segregate the hazard index for mercury from the other chemicals of concern.

The statement "Therefore, analysis by toxic effect is not necessary for this RA." is incorrect and somewhat misleading. The point should be made that the majority of potential noncarcinogenic health effects associated with the basin are associated with exposure to mercury through fish ingestion and when the hazard index for mercury is segregated from the hazard index for the other chemicals of concern, both hazard index values are below unity.

[2]132. The definition of slope factor in the text of the risk assessment is identical to the definition presented in EPA risk assessment guidance (RAGS, 1989) page 7-12, paragraph 2. The term potency factor is no longer utilized, it has been replaced by slope factor.

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[1] The first of two EPA comments numbered 132.

[2] The second of two EPA comments numbered 132.

133. The upper 95th percent upper bound estimate of the probability of a response per unit intake of a chemical over a lifetime represents an estimated risk value of which there is only a 5 percent chance that the probability of a response could be greater than the estimated value.

134. In the preamble to the NCP the Agency states that the 10^{-6} risk level be used as a point of departure for establishing remediation goals for the risks from constituents at specific sites. In general, 10^{-6} is the accepted point of departure for acceptable risk and will be used in the final baseline risk assessment.

135. This comment is valid. The appropriate oral reference doses for inorganic and alkyl are the same.

136. Fish sampling and analysis will be conducted as part of the RI/FS. These fish sampling data will be used for the final baseline risk assessment (both the human health assessment and the environmental assessment).

137. The data was submitted to EPA to inform EPA of the investigative activities that had taken place at the site. However, these data were suspect due to the limited sampling, and Olin did not believe it was appropriate to use the data in the baseline risk assessment. Additional fish sampling is proposed in the RI/FS Work Plan.

138. See response to general comment 7.

139. Mercury concentrations in the basin surface water are compared to AWQC values in Section 6.0 of the 1989 RI/RA.

140. The final baseline risk assessment for the Olin site will be conducted in accordance with EPA's Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual, 1989, EPA/540/1-89/002 (RAGS).

141. Intake for carcinogens is based on an exposure duration included in the numerator and an averaging time equal to a lifetime or 70 years in the denominator as presented in Chapter 6 of RAGS.

142. See response to comment 130.